PRELIMINARY

Health Assessment for

NL INDUSTRIES/TARACORP LEAD SITE

GRANITE CITY, MADISON COUNTY, ILLINOIS

JANUARY 18, 1989

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

PRELIMINARY HEALTH ASSESSMENT
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GRANITE CITY, ILLINOIS
January 18, 1989

Prepared by:
Office of Health Assessment
Agency for Toxic Substances and Disease Registry

Background

The NL Industries site is a National Priorities List (NPL) Site located in Granite City, Madison County, Illinois. Metal refining, fabricating, and associated activities were conducted at the site until 1903, when the secondary lead smelting operation was started. The secondary smelting operations produced a number of products, including sheet lead solder, shotgun lead pellets, lead wool, lead pipe, powdered lead, and secondary lead ingots. Historically, solid waste generated by the manufacturing facilities was stored on-site in a slag storage area. Liquid wastes were discharged through process sewers, which ran under the site, to the municipal sewer system.

NL Industries, Inc., formerly the National Lead Company, bought the site in 1928. Battery recycling facilities were installed at the site in the 1950's. In August 1979, NL Industries, Inc. sold the site to Taracorp, Inc., who operated the secondary lead smelting operation until 1983, when it filed for protection from its creditors under Chapter 11 of the Federal Bankruptcy Code. Taracorp is presently operating metal refining and fabricating facilities at the site.

A waste pile, composed of blast furnace slag, lead bearing fines in 55-gallon drums, and battery case material, is located on site. The volume of the pile is approximately 85,000 cubic yards. In addition, smaller piles, which were associated with the adjacent St. Louis Lead Recycler's operation, comprise 6300 cubic yards.

Environmental Contamination and Physical Hazards

A. Environmental Contamination

Groundwater in the vicinity of the site is contaminated with elevated levels of sulfates (288 mg/l), dissolved solids (993 mg/l), and manganese (0.99 mg/l).

The waste piles on site were sampled; analyses revealed elevated levels of lead (15,000-286,000 mg/kg), arsenic (620-4100 mg/kg), copper (5,800-11,000 mg/kg), and iron (21,000-340,000 mg/kg). Runoff from the waste pile has shown concentrations of lead ranging from 3 to 40 mg/l.

On-site soils have shown lead concentrations ranging from 1550-48,300 mg/kg. Soil lead sampling demonstrated surface soil lead concentrations in residential neighborhoods within 2000 feet east of the site at approximately 386-3600 mg/kg. Other areas near the site have shown similar concentrations of lead (400-3000 mg/kg).

The results of quarterly air sampling in the vicinity of the site in 1986 were considerably below the National Ambient Air Quality (NAAQ) standard for lead of 1.5 ug/m^3. Lead concentrations were detected in the air at locations near the site ranging from 0.13-0.42 ug/m^3.

B. Physical Hazards

There are no known physical hazards present at the NL Industries NPL Site.

Potential Environmental and Exposure Pathways

A. Environmental Pathways

1. Surface Water

The nearest surface water body to the site is the Chain of Rocks Canal, which is located over one mile away. No drainage swales or ditches were observed at the site which would connect storm runoff from the site to this surface water body.

Studies conducted as part of the Remedial Investigation (RI) have evaluated the characteristics of storm water runoff from the waste piles on site. The runoff has contained concentrations of lead in the range of 3-40 mg/l. Runoff from the pile either infiltrates and percolates to groundwater or evaporates.

2. Groundwater

The American Bottoms aquifer underlies the site. This unconfined aquifer is composed of clay, silt, and sand. It extends to at least 35 feet below the surface. Groundwater has been encountered at an average depth of 24 feet below the surface. The site is underlain to a depth of approximately 100 feet by alluvial, glaciofluvial, and glaciolacustrine deposits, which become progressively coarser with depth.

Water within the unconsolidated deposits beneath Granite City is used for industrial purposes. At least 36 private wells have been reported to be within two miles of the site. The RI stated, however, that it was not known whether these wells are used as potable water supplies. The Granite City Water System supplies most of the drinking water to the area residents. It uses the Mississippi River as its water source.

Twelve monitoring wells were installed at and near the site in October 1982. Additional monitoring wells have been installed since this date. Two on-site wells showed elevated concentrations, as compared to background, of sulfates, dissolved solids, arsenic, cadmium, manganese, nickel, and zinc. Off-site monitoring wells located downgradient of the site did not show any contamination at the time of the sampling.

Locally, the groundwater flows in a south-southwesterly direction towards the Mississippi River. Groundwater underlying the site is characterized by elevated levels of dissolved solids, sulfates, and manganese and does not appear to be suitable for development as a potable water supply.

3. Soil

Ninety-eight surface soil samples were taken from 52 locations on and off the site (primarily from off-site areas). Most of the samples were taken at depths of 0-3 and 3-6 inches below grade. Elevated levels of lead were found in the soil.

The waste piles located on the site were sampled and elevated levels of lead, arsenic, copper, and iron were found.

4. Air

The Illinois Environmental Protection Agency (ILEPA) operates several air quality sampling stations in the vicinity of the site and has generated quarterly monitoring data since 1978. Air quality at the monitoring locations near the site has been well within the NAAQ standard for lead.

B. Human Exposure Pathways

Based on the environmental media that have been contaminated at the site, the concentrations of contaminants that were found in these media, and the potentially exposed population near the site, the human exposure pathways of concern at the NL Industries site are as follows:

1. Inhalation of contaminated dust/soil.

2. Ingestion of contaminated soil.

3. Dermal absorption of contaminants found in the soil.

4. Ingestion of contaminated groundwater.

Demographics and Land Use

The site is located within a heavily industrialized section of Granite City, Illinois. Granite City is a community of approximately 40,000

located across the Mississippi River from St. Louis, Missouri. Residential and commercial areas are also located near the site. The site is located adjacent to properties owned by Trust 454, Terminal Railroad Associates, Inc., Illinois Central Gulf Railroad, Chicago and Northwestern Railroad, and Tri-Cities Trucking, Inc. St. Louis Lead Recycler's, Inc. is a tenant of trust 454.

Evaluation and Discussion

Because the soils and waste pile at the site are contaminated with lead and other inorganics, there is the possibility that contaminated soil particulates may become airborne and travel off-site as the result of wind, traffic, remedial activities (i.e., excavating, trenching), or recreational activities (i.e., bike riding). Remedial workers and others that may gain access to the site may also be exposed to contaminants found in the soils via accidental ingestion or dermal absorption while involved in on-site activities.

Because lead has been detected in residential surface soils at elevated levels, children playing in the area may be at special risk from exposure to contaminants because of the cumulative nature of their exposure and the fact that they are the most sensitive subpopulation for lead induced toxicity. In general, lead in soil and dust appears to be responsible for blood lead levels in children increasing above background levels when the concentration in the soil or dust exceeds 500 - 1000 mg/kg (Baker, et al., 1977; Mielke et al., 1984; Angle et al., 1984; Duggan and Inskip, 1985). The concentrations of lead found in the residential areas near the site showed concentrations up to three times higher than these levels.

The water underlying the site does not appear to be suitable for potable uses; however, this possible exposure pathway cannot be dismissed until further information is available. Because it is not known if there are private wells being used for drinking water supplies in the vicinity of the site, there is the possibility that residents are being exposed to site-related contamination via ingestion of contaminated groundwater.

Particulate lead compounds can be absorbed into the body via both the respiratory and gastrointestinal tracts with varying degrees of efficiency. Lead exposure is linked with neurological effects, systemic toxicity, including anemia and other hematologic effects, and reproductive effects.

Conclusions and Recommendations

Based on the available information, this site is considered to be of public health concern because of the risk to human health caused by the likelihood of exposure to hazardous substances via inhalation, ingestion, and direct contact exposures to contaminated soil. There is also the possibility that the human population in the area is being exposed via ingestion of contaminated groundwater.

If further environmental characterization, sampling from on-site areas, or sampling from impacted off-site areas become available, such material will form the basis for further assessment at a later date.

ATSDR recommends the following for the protection of public health near the site:

1. The contamination of residential soil in the vicinity of the NL Industries Site should be accurately evaluated. Such an evaluation should allow for an adequate determination of the levels of exposure of individuals per residence. If residents, specifically children, are indeed exposed to levels of contaminants, namely lead, which may result in adverse health effects, actions should immediately be taken to prevent further exposure.

2. It should be verified that there are no private wells being used as potable water supplies in the vicinity of the site.

3. On-site workers involved in remedial activities should be equipped with adequate personal protective equipment as required by the Occupational Safety and Health Administration (OSHA) and recommended by the National Institute for Occupational Safety and Health (NIOSH).

4. Air monitoring should be continued to insure that concentrations of lead in the ambient air remain below NAAQ standards.

References

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